



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILED DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/616,889	07/10/2003	Ji-Hyang Kim	4366-031330	1682
7590	07/14/2004			
Richard L. Byrne WEBB ZIESENHEIM LOGSDON, ORKIN & HANSON, P.C. 700 Koppers Building 436 Seventh Avenue Pittsburgh, PA 15219-1818			EXAMINER	HU, HENRY S
			ART UNIT	PAPER NUMBER
			1713	
DATE MAILED: 07/14/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/616,889	KIM ET AL.
	Examiner	Art Unit
	Henry S. Hu	1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on _____.
 2a) This action is **FINAL**. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-15 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
 5) Claim(s) ____ is/are allowed.
 6) Claim(s) 1-15 is/are rejected.
 7) Claim(s) 1 is/are objected to.
 8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 10 July 2003 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date _____.
 4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date _____.
 5) Notice of Informal Patent Application (PTO-152)
 6) Other: _____.

DETAILED ACTION

1. It is noted that the examiner has **objected the drawing sheets with Fig. 1 and 2** filed with this application. **Claims 1-15 are pending** now. An action follows.

Specification

2. The disclosure is objected to because of the following informalities:

(a) On page 4, line 23 as well as on page 6, line 6, the description of “**y is a natural number of 1-10**” may be wrong since y units of styrene are attached to R_F on left side are limited similar to the restriction on right side R_F. It is noted that **y' is only an integer of 0-1**. Therefore, the examiner suggests the Applicants confirming y in order to be clear.

(b) On page 23 at line 16, recitation of “0.3-1%” may be improper and should be changed to “**0.3-1.0 wt%**” according to traditional wording. Please refer to page 21 at line 3 for a correct wording.

Appropriate corrections for (a) and (b) are required.

Drawings

3. INFORMATION ON HOW TO EFFECT DRAWING CHANGES

3-1. Correction of Informalities -- 37 CFR 1.85

New corrected drawings must be filed with the changes incorporated therein. Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and centered within the top margin. If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings **MUST** be filed within the **THREE MONTH** shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may NOT be obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

3-2. Corrections other than Informalities Noted by Draftsperson on form PTO-948.

All changes to the drawings, other than informalities noted by the Draftsperson, **MUST** be made in the same manner as above except that, normally, a highlighted (preferably red ink) sketch of the changes to be incorporated into the new drawings **MUST** be approved by the examiner before the application will be allowed. No changes will be permitted to be made, other than correction of informalities, unless the examiner has approved the proposed changes.

Timing of Corrections

Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.185(a). Failure to take corrective action within the set (or extended) period will result in **ABANDONMENT** of the application.

The examiner has found that both figures, Fig. 1 and Fig. 2, are not clear in the image including lines, numbers and letters. Please make corrections.

Claim Objections

4. Claim 1 is objected to because of the following informalities:

On **Claim 1** at line 8, the description of “y is a natural number of 1-10” may be wrong since y units of styrene are attached to R_F on left side are limited similar to the restriction on right side R_F . It is noted that y' is **only an integer of 0-1**. Therefore, the examiner suggests the Applicants confirming the y factor in order to be clear.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

*The limitation of parent **Claim 1** of the present invention relates to a fluorinated compound having perfluorostyrene introduced at a terminal thereof, as represented in **Formula 1**, wherein Z is O or S; R_F is an aliphatic or aromatic group; y is a natural number of 1-10; y' is an integer of 0-1; x is an integer of 0-200; and Ar is $-C_6F_4-B-C_6F_4-$ or $-C_6(F)_3(Hal)-$, wherein B is a single bond or selected from the group consisting of $-CO-$, $-SO_2-$, $-S-$ and $-O-$; and Hal is selected from the group consisting of F, Cl, Br and I. See other limitations of dependent **Claims 2-15**.*

6. Claims 1-8, 10 and 14 are rejected under 35 U.S.C. 102(a) as being anticipated by Ding et al. (Journal of Polymer Science: Part A: Polymer Chemistry, Vol. 40, 4205-4216 (2002)).

Regarding the limitation of parent **Claim 1**, Ding et al. disclose the preparation of **various fluorinated styrene-endcapped monomer compounds read on the claimed compound** (see Scheme 2 and 3 on pages 4209-4210). The preparation is generally achieved by polycondensation of decafluorobenzophenone with hexafluorobisphenol and then **coupled with crosslinkable pentafluorostyrene (FSt) moieties into the styrene-endcapped polymers**.

It is noted that Ding's paper was published after August 2002. However, Applicants cannot rely upon the foreign priority paper (**7-12-2002**) to overcome this rejection because a **translation** of said priority paper (Korea 10-2002-0040901) has not been made of record in accordance with 37 CFR 1.55. See MPEP 201.15.

7. Regarding **Claims 2-8 and 10**, the chemical structures of various fluorinated styrene-endcapped monomer compounds shown on above-mentioned Schemes 2-3 have all the required limitation.

Regarding **Claim 14**, Ding et al. disclose that such obtained fluorinated crosslinkable polymers are useful materials for **light transmission media of fiber optical** telecommunication components, certainly including optical waveguide device (page 4205 on introduction).

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 1-8, 10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mercer et al. (US 5,115,082) in view of Smith et al. (US 6,323,301 B1).

Regarding the limitation of parent **Claim 1**, Mercer et al. disclose the preparation of **various fluorinated hydroxyl-endcapped polymeric compounds, which is structurally a fluorinated poly(arylene ether) with the main chain read on the claimed compound** (see title; column 3, line 55 – column 9, line 68).

Mercer's functional polymer is generally achieved by polycondensation of decafluorobenzophenone with hexafluorobisphenol, but is silent of **coupling it with**

crosslinkable pentafluorostyrene (FSt) moieties into the styrene-endcapped polymers.

Smith et al. teach that the styrene-terminated polyethers can be prepared, the advantage is such styrene-functionalized resins are photochemically or thermally labile to form a highly crosslinked networks, and without any volatile by-products during the curing (column 6, line 10-22 and 48-67).

In light of the fact that both Mercer and Smith used polyethers for optical application. Therefore, one having ordinary skill in the art would find it obvious to modify Mercer's polymer composition for using in optical application by **coupling it with crosslinkable pentafluorostyrene (FSt) moieties into the styrene-endcapped polymers** as taught by Smith. By doing so, crosslinked copolymers can be obtained through curing either photochemically or thermally to form a rigid network and without emitting any volatile by-products during the curing. A better optical guide can be thereby obtained.

10. Regarding **Claims 2-8 and 10**, the chemical structures of various fluorinated hydroxyl-endcapped polymeric compounds shown on above-mentioned disclosure by Mercer have all the required limitation.

Regarding **Claim 14**, Smith et al. has disclosed that such obtained fluorinated crosslinkable polymers are useful materials for **light transmission media of fiber optical telecommunication components** such as photoresists (column 1, line 10-13), certainly including optical waveguide device.

11. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ding et al. (Journal of Polymer Science: Part A: Polymer Chemistry, Vol. 40, 4205-4216 (2002)) in view of Fritsch et al. (US 5,438,142).

The discussion of the disclosures of the prior art of Ding for the rejection of Claims 1-8, 10 and 14 of this office action is incorporated here by reference. Regarding **Claim 9**, the Ding reference is silent about the preparation of a polymer **using a claimed tri-substituted ring moiety**. **Fritsch** et al. teach that various types of trihydroxyl-functional compounds can be prepared, the advantage is they are able to incorporated into condensation polymer (title; abstract, line 1-5; columns 2-4).

In light of the fact that hydroxy-functionalized monomer was used for condensation reaction by Ding and Fritsch. Therefore, one having ordinary skill in the art would find it obvious to modify Ding's polymer composition for using in optical application by replacing dihydroxyl monomer with tri-hydroxyl monomer as taught by Fritsch. By doing so, such replacement will increase the number of functionalities and molecular weight on obtained copolymers. Moreover, it can provide an effective crosslinking when cured. A better optical guide can be thereby obtained.

12. Claims 11-13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ding et al. (Journal of Polymer Science: Part A: Polymer Chemistry, Vol. 40, 4205-4216 (2002)) in view of Hult et al. (US 6,002,828).

The discussion of the disclosures of the prior art of Ding for the rejection of Claims 1-8, 10 and 14 of this office action is incorporated here by reference. Regarding **Claims 11-13 and 15**, the **Ding** reference is silent about the preparation of a polymer coating solution by further including a diacrylate compound and a photoinitiator. **Hult** et al. teach that in the course of making fluorinated polymer as optical guides, **derivatives of styrene and acrylate can be used together for co-polymerization since such copolymers provide advantage of low optical attenuation as well as no cracking, particularly when pentafluorostyrene is involved** (column 3, line 11-65).

In light of the fact that distyrene-monomer was used by Ding and Hult as well as both references are for optical application. Therefore, one having ordinary skill in the art would find it obvious to modify Ding's polymer composition for using in optical application by adding a diacrylate compound and a photoinitiator as taught by Hult. By doing so, such obtained copolymers can provide two advantages with low optical attenuation and no cracking due to an excellent compatibility between styrene and acrylate. A better optical guide can be thereby obtained.

13. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mercer et al. (US 5,115,082) in view of Smith et al. (US 6,323,301 B1) as applied to Claims 1-10 and 14, and further in view of Fritsch et al. (US 5,438,142).

The discussion of the disclosures of the prior art of Mercer/Smith for the rejection of Claims 1-8, 10 and 14 of this office action is incorporated here by reference. Regarding **Claim 9**, the Mercer/Smith references are silent about the preparation of a polymer **using a claimed tri-substituted ring moiety**. **Fritsch** et al. teach that various types of trihydroxyl-functional compounds can be prepared, the advantage is they are able to incorporated into condensation polymer (title; abstract, line 1-5; columns 2-4).

In light of the fact that hydroxy-functionalized monomer was used for condensation reaction by Mercer, Smith and Fritsch. Therefore, one having ordinary skill in the art would found it obvious to modify Mercer/Smith's polymer composition for using in optical application by replacing di-hydroxyl monomer with tri-hydroxyl monomer as taught by Fritsch. By doing so, such replacement will increase the number of functionalities and molecular weight on obtained copolymers. Moreover, it can provide an effective crosslinking when cured. A better optical guide can be thereby obtained.

14. Claims 11-13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mercer et al. (US 5,115,082) in view of Smith et al. (US 6,323,301 B1) as applied to Claims 1-10 and 14, and further in view of Hult et al. (US 6,002,828).

The discussion of the disclosures of the prior art of Mercer/Smith for the rejection of Claims 1-8, 10 and 14 of this office action is incorporated here by reference. Regarding **Claims 11-13 and 15**, the references are silent about the preparation of a polymer coating solution by further including a diacrylate compound and a photoinitiator. **Hult et al.** teach that in the course of making fluorinated polymer as optical guides, **derivatives of styrene and acrylate can be used together for co-polymerization since such copolymers provide advantage of low optical attenuation as well as no cracking, particularly when pentafluorostyrene is involved** (column 3, line 11-65).

In light of the fact that distyrene-monomer was used by Hult and Mercer/Smith as well as all references are for optical application. Therefore, one having ordinary skill in the art would found it obvious to modify Mercer/Smith's polymer composition for using in optical application by adding a diacrylate compound and a photoinitiator as taught by Hult. By doing so, such obtained copolymers can provide two advantages with low optical attenuation and no cracking due to an excellent compatibility between styrene and acrylate. A better optical guide can be thereby obtained.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. The following references relate to a fluorinated compound having **perfluorostyrene**

introduced at a terminal thereof, as represented in Formula 1: US Patent No. 6,235,353 B1 to Drage et al. disclose the preparation of low loss **poly(arylene ethers), which can be cured by exposure to electron beam radiation** (abstract, line 1-3; column 4, line 9 – column 8, line 32). However, the fluorinated polyethers **are not endcapped with the claimed styrene functionality.**

16. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Henry S. Hu whose telephone number is **(571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306 for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Henry S. Hu

June 12, 2004

H.S.H.

DAVID W. WU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700